Navy Advancement Center
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Advancement Handbook for Gas Turbine Systems Technician (Mechanical)

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PREFACE

The purpose of the Advancement Handbook is to help you focus your preparation for Navywide advancement-in-rating examinations. The bibliographies (BIBs) together with this handbook form a comprehensive examination study package. Since this handbook provides skill and knowledge components for each paygrade of the Gas Turbine Systems Technician (Mechanical) rating, it helps you concentrate your study on those areas that may be tested. This feature will help you get the most out of your study time.

Each page in Parts 1 through 4 of this Advancement Handbook presents general skill areas, specific skill areas, the knowledge factors associated with each skill area, the pertinent references that address each skill, and the subject areas that may be covered on the examination. The skill statements describe the skills you are expected to perform for each paygrade. The skill statements are cumulative; that is, you are responsible for the skills for the paygrade you are competing for, your present paygrade, and all paygrades below.

Although this handbook is very comprehensive, it cannot cover all the tasks performed in the rating. As a result, the advancement examinations may contain questions more detailed than described in the *"Exam Expectations"* section of the skill areas.

Remember that advancement competition is keen, so your keys to advancement include not only comprehensive advancement examination study but also sustained superior performance.

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Part 1

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General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Operate gas turbine engines locally**
Knowledge you should have to perform this skill:	Gas turbine engine starting and stopping procedures • EOSS procedures • Parameters • Starting sequence • Stopping sequence • Types of starts • Types of stops • Recognize casualties during starting or stopping
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 3 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 4 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the preparation of the engines for starting, the starting procedures, cautions and parameters to be observed during the start/stop procedures, and casualty control actions required during the procedures.

General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Operate gas turbine generators locally**
Knowledge you should have to perform this skill:	Gas turbine generator starting and stopping procedures • EOSS procedures • Parameters • Starting sequence • Stopping sequence • Types of starts • Types of stops • Recognize casualties during starting or stopping
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapter 3) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapter 3) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010–060/MOD AG9130 GTGS, Chapter 2) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapter 3) • Propulsion Plant Manuals for DD-963, CG-47, and DDG-51 Class Ships; Volume 2 • NSTM, Chapter 234

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the preparation of the generators for starting, the starting procedures, cautions and parameters to be observed during the start/stop procedures, and casualty control actions required during the procedures.

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General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, troubleshoot, repair and replace gas turbine generator components**
Knowledge you should have to perform this skill:	• Identify all components of the GTGS • Component cleaning procedures • Component testing and troubleshooting concepts • Component repair and replacement procedures
References you should study to gain the knowledge you need to perform this skill:	• Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 5, 6, 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 5, 6, 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapter 3-6) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapter 2-6) • Propulsion Plant Manuals for DD-963, CG-47, and DDG-51 Class Ships; Volume 2 • NSTM, Chapter 234
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about GTGS component operation, inspection, testing, troubleshooting, repair, and replacement procedures and practices.

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General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, and repair power turbine and PT brake components**
Knowledge you should have to perform this skill:	• Identify power turbine components • Identify power turbine brake components • Component cleaning practices • Component testing procedures • Component repair concepts
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • NSTM, Chapter 234 • NSTM, Chapter 241
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the identification, operation principles, and repair procedures for power turbines and power turbine brake assemblies.

General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, troubleshoot, repair and replace GT fuel system and combustion section components**
Knowledge you should have to perform this skill:	• Identify combustion chamber and fuel system components • Operation of combustion chamber and fuel system components • Test, repair, and replacement principles of combustion chamber and fuel system components
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapters 6 and 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 5, 6, 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 5, 6, 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010–060/MOD AG9130 GTGS, Chapters 3-6, and 8) • Operation and Maintenance Manual for

	Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapters 2-6)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation, inspection, repair and replacement of GT combustion chamber and fuel system components.

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General GSM S*kill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, troubleshoot, and replace accessory gear box components**
Knowledge you should have to perform this skill:	• Identify accessory gear box components • Operation of accessory gear box components • Troubleshooting and replacement principles of accessory gear box components
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapters 6 and 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 3, 6, 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 3, 6, 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapters 3-6) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU)

	System/Installation (S9311-A3-MMA-010, Chapter 2) • Propulsion Plant Manuals for DD-963, CG-47, and DDG-51 Class Ships; Volumes 1 and 2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation, troubleshooting and replacement of accessory gear box components.

General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Water wash gas turbines, test and repair water wash systems**
Knowledge you should have to perform this skill:	• Requirements for water washing engines • Procedures for water washing engines • System testing and repair procedures
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volumes 1 and 2 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010–060/MOD AG9130 GTGS, Chapters 2, 4) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the required conditions for water washing a GTE/GTG, what the procedures are, and how to test the water wash system.

General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, and repair inlet and exhaust systems, moisture separators and blow-in-doors**
Knowledge you should have to perform this skill:	• Identify inlet and exhaust system components • Identify cleaning methods and signs of foreign object hazards • State the purpose of blow-in-doors and moisture separators • Identify components of blow-in-door and moisture separators • State the testing procedures for blow-in-doors and moisture separators
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volumes 1 and 2 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 6) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 6)

	• Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapters 2, 3) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect question about GTE inlet and exhaust system cleaning, inspection, foreign object hazard detection and correction, blow-in-door and moisture separator testing and repair.

General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain GT lube oil system**
Knowledge you should have to perform this skill:	• Safety precautions to be observed when working with synthetic oil • Lube oil system parameters • Lube oil system component replacement procedures and principles
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapters 1 and 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volumes 1 and 2 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 3, 6, 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 3, 6, 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapters 2-6) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about GTE lube oil system alignment, monitoring, troubleshooting, component replacement, and safety precautions.

General GSM *Skill Area*	**Gas Turbine Engines**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, and test GT modules**
Knowledge you should have to perform this skill:	• Inspection criteria for GT modules
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volumes 1 and 2 • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapters 2, 6)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about GT module inspections and repairs.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, measure, cut, and fit lagging pads**
Knowledge you should have to perform this skill:	• Identify types, purposes and repair procedures of insulating materials
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 635
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about piping system lagging and insulation methods, materials and repair and replacement criteria.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, test, troubleshoot, and repair air compressors and compressor components**
Knowledge you should have to perform this skill:	• Operation precautions and procedures • Monitor parameters • Identify compressor components • Identify malfunctioning components • Identify abnormal conditions and the corrective action required • Compressor repair principles
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • NSTM, Chapter 551 • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, DD-963, and DDG-51 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about air compressor component identification and replacement, compressor operation, trouble detection/isolation, and repair.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, and replace bleed air system components, and operate bleed air systems from control consoles**
Knowledge you should have to perform this skill:	• Bleed air system configurations for ship operations • System parameters • Identify bleed air system components • Recognize malfunctions in system components
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • NSTM, Chapter 551 • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, DD-963, and DDG-51 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the ships bleed air systems with regard to alignments for Masker, Prairie, Anti-icing, and Starting, bleed air sources, system parameters, and component troubleshooting and identification.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain auxiliary/waste heat boilers/waste heat recovery systems**
Knowledge you should have to perform this skill:	• Identify auxiliary boiler components • Identify waste heat boiler components • Identify waste heat recovery system components • Observe precautions and instructions when replacing components • Operation of auxiliary boilers • Operation of waste heat boilers • Operation of waste heat recovery system • Boiler cleaning and inspection requirements
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221 • NSTM, Chapter 220, Volumes 1 and 2 • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, and DD-963 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation and maintenance of auxiliary and waste heat boilers and waste heat recovery systems, the requirements for cleaning and inspection of boilers, and component identification and operation.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Operate waste oil systems**
Knowledge you should have to perform this skill:	• Oily waste system operations • Environmental hazards of oily waste systems • Operation principles of oil/water separators and waste oil systems • Identify oily waste spill kit components • Identify oily waste spill containment procedures
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, DD-963, and DDG-51 Class Ships; Volume 3 • OPNAVINST 5090.1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation and maintenance of the oily waste system, oil/water separators, and environmental restrictions/hazards.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, troubleshoot, repair, and replace pumps and pump components**
Knowledge you should have to perform this skill:	• Identify pump components • Identify and classify pump types • Understand pump repair principles • Identify pump abnormalities and required corrective actions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 503 • Fireman TRAMAN
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about pump classification, component identification, and pump and component repair and replacement principles.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, repair and maintain valves and mechanical valve actuators/operators**
Knowledge you should have to perform this skill:	• Identification of valves and valve types • Classification of valves • System requirements for valves • Maintenance requirements of valves
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 505 • Fireman TRAMAN
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about valve classification and identification, system requirements, and valve repair procedures and requirements.

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General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, and adjust temperature detectors and regulators**
Knowledge you should have to perform this skill:	• Identify temperature regulators and detection devices • Adjust temperature regulators • Repair temperature regulators
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 504 • Fireman TRAMAN
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about temperature regulator/detector identification, testing and repair.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, repair, and maintain piping systems**
Knowledge you should have to perform this skill:	• Identify discrepancies in piping and flexible hoses • Repair of piping and flexible hoses • Identify discrepancies in piping system components such as supports and sound isolation mounts • Inspect flange shielding and repair as necessary
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 505
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about piping system component inspection and repair to include pipes, flange shielding, flexible hoses, RISIC couplings, and supports/hangers, and piping identification and classification.

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General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, troubleshoot, and repair ship's service air systems**
Knowledge you should have to perform this skill:	• Identification of air system components • Purpose of air system components • Required tests of air systems • Identify and correct abnormal conditions in air systems
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 551 • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, DD-963, and DDG-51 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about ship's service air system testing, troubleshooting, inspection and repair.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean and inspect hydraulic system components**
Knowledge you should have to perform this skill:	• Principles of operation of hydraulic systems • Identify hydraulic system components
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter. 556 • Fluid Power TRAMAN
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about hydraulic system operating principles and component identification.

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General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, replace, and calibrate gauges**
Knowledge you should have to perform this skill:	• Identify and classify gauges • Verify calibration of gauges • Identify precautions to be observed during gauge replacement
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter. 504
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about gauge classification, calibration, and replacement procedures.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, troubleshoot, and repair cooling water systems and heat exchangers/coolers**
Knowledge you should have to perform this skill:	• Identify cooling water system components • Classify heat exchangers/coolers • Repair procedures for heat exchangers/coolers • Water system trouble identification, isolation and correction
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter. 254 • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, DD-963, and DDG-51 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about cooling water system components, maintenance troubleshooting, and repair, heat exchanger/cooler classification, maintenance and repair.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, troubleshoot, replace and repair main drainage system components**
Knowledge you should have to perform this skill:	• Identify main drain system components • Identify main drain system capabilities • Identify main drain system malfunctions and corrective action
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 079, Volume 2, Section 30 • Propulsion Plant Manuals for AOE-6, CG-47, FFG-7, DD-963, and DDG-51 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about main drain system operation, component identification and system capabilities and maintenance.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Operate, clean, inspect, test, troubleshoot, adjust, and repair CRP/CPP system and components**
Knowledge you should have to perform this skill:	• CRP/CPP/LCAC propeller control system operation • CRP/CPP/LCAC propeller control system component identification • CRP/CPP/LCAC propeller control system trouble isolation and corrective action • CRP/CPP/LCAC propeller control system maintenance procedures
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for LCAC Propulsion System (S9200-A6-MMA-010, Chapter 5)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the CRP/CPP system operation, component identification, trouble identification and corrective action. This section also applies to the LCAC propeller control system.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, test, and troubleshoot stern tube, bulkhead, shaft seals, and line shaft bearings**
Knowledge you should have to perform this skill:	• Identify stern tube, bulkhead, and shaft seal components • Identify abnormal conditions and corrective action required • Classify line shaft bearings • Identify line shaft bearing abnormal conditions and the corrective action required
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter. 243 • NSTM, Chapter. 244 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about propulsion shafting characteristics, stern tube, bulkhead, and shaft seal components and trouble isolation.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, test, troubleshoot, and maintain lube oil service system**
Knowledge you should have to perform this skill:	• Identify critical lube oil system parameters • Identify abnormal conditions in the lube oil service system and the corrective action required • Identify components of the lube oil service system • Identify security and cleanliness requirements when replacing lube oil system components • Identify precautions to be observed when engaging and disengaging attached pumps
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter. 262 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about lube oil service system operation, component identification, system troubleshooting, component replacement, system maintenance, and attached pump operation.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, test, troubleshoot, and maintain lube oil fill/transfer system**
Knowledge you should have to perform this skill:	• Identify lube oil fill/transfer system components • Classify lube oil purifiers • Identify lube oil sampling and testing requirements and clean oil criteria • Identify abnormal conditions in the lube oil fill/transfer system and the corrective action required • Identify lube oil fill/transfer system operating parameters
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter. 262 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about lube oil fill/transfer system components, lube oil purifiers and heaters, operating parameters, oil sampling and testing, and precautions to be observed during system operation.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, and test reduction gear and clutch/brake assembly components**
Knowledge you should have to perform this skill:	• Identify MRG components • Identify Clutch/Brake assembly components • Test MRG and Clutch/Brake assembly components • Identify MRG operational requirements • Identify right angle drive gear box components
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 241 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Description and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Transmission system (NAVSEA S9240-AA-MMA-010)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about Main Reduction Gear and Clutch/Brake assembly components, testing, and operation and LCAC transmission system operation, components and testing.

Advancement Handbook for GSM3

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Rotate shafts with jacking gears**
Knowledge you should have to perform this skill:	• Identify jacking gear components • Identify jacking gear operating requirements • Identify jacking gear safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 241 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about jacking gear operation, component identification, and jacking gear safety precautions.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, test, troubleshoot, and maintain prairie, masker, and start air systems**
Knowledge you should have to perform this skill:	• Identify prairie, masker, and start air system components • Identify prairie, masker, and start air system abnormal conditions and the corrective actions required • Identify component replacement safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 551 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about prairie, masker, and start air system maintenance, operation, and troubleshooting.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, test, troubleshoot, and maintain fuel oil service system**
Knowledge you should have to perform this skill:	• Identify fuel oil service system components • Identify abnormal conditions in the fuel oil service system and the corrective action required • Identify fuel oil service system operating parameters
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 541 • NSTM, Chapter 542 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Craft Information Book, Section II, Part 1, Chapter 7 (NAVSEA S9LCA-AA-SIB-010)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about fuel oil service system operation, testing, troubleshooting, maintenance, and component identification.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Clean, inspect, operate, test, and troubleshoot fuel and fuel oil fill/transfer systems**
Knowledge you should have to perform this skill:	• Identify fuel oil fill/transfer system components • Identify fuel oil fill/transfer system operating requirements • Identify abnormal conditions in the fuel oil fill/transfer system and the corrective action required • Identify fuel oil testing requirements and clean fuel criteria • Maintain fuel testing logs
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 541 • NSTM, Chapter 542 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Craft Information Book, Section II, Part 1, Chapter 7 (NAVSEA S9LCA-AA-SIB-010)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about fuel oil fill/transfer system operation, testing, components, maintenance, fuel oil purifiers and heaters, and fuel oil sampling and testing requirements and clean fuel criteria.

General GSM *Skill Area*	**Environmental Protection**
A *skill* you are expected to perform from the General Skill Area above:	**Record dry bulb temperature readings**
Knowledge you should have to perform this skill:	• Identify proper location of dry bulb thermometers • Identify heat stress program requirements
References you should study to gain the knowledge you need to perform this skill:	• Engineering Department Organization and Regulations, Chapter 5 • OPNAVINST 5100.19, Section B2, Shipboard Heat Stress Control and Personnel Protection
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the shipboard heat stress program requirements, restrictions, and precautions.

General GSM *Skill Area*	**Environmental Protection**
A *skill* you are expected to perform from the General Skill Area above:	**Review and inspect hazardous material program requirements**
Knowledge you should have to perform this skill:	• Identify hazardous materials • Recognize hazardous material identification markings • State the storage requirements and limitations of hazardous material • Identify material safety data sheets • Identify oil spill kit components and usage procedures
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 593 • OPNAVINST 5100.19, Section B3, Hazardous Material Control and Management Program
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the hazardous material program with respect to material storage, disposal, spill clean up, and use and handling precautions as directed by MSDS sheets and the Hazardous Material instruction.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Record meter readings**
Knowledge you should have to perform this skill:	• Identify critical readings required in the engineering plant • Identify log keeping requirements and procedures for recording readings
References you should study to gain the knowledge you need to perform this skill:	• Engineering Department Readiness and Organization Manual
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the requirements and procedures of record keeping.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Prepare daily fuel and water reports**
Knowledge you should have to perform this skill:	• Identify instructions for preparing fuel and water report • Properly complete the fuel and water report
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volume 2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the preparation and retention of the fuel and water report.

Part 2

Advancement Handbook for GSM2

Advancement Handbook for GSM2

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Operate gas turbine engines remotely**
Knowledge you should have to perform this skill:	Gas turbine engine starting and stopping procedures • EOSS procedures • Parameters • Starting sequence • Stopping sequence • Types of starts • Types of stops • Recognize casualties during starting or stopping
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 3 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 4 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the preparation of the engines for starting, starting procedures, cautions and parameters to be observed during the start/stop procedures, and casualty control actions required during the procedures.

Advancement Handbook for GSM2

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Operate gas turbine generators remotely**
Knowledge you should have to perform this skill:	Gas turbine generator starting and stopping procedures • EOSS procedures • Parameters • Starting sequence • Stopping sequence • Types of starts • Types of stops • Recognize casualties during starting or stopping • Identify gas turbine engine theory principles and laws
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapter 3) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapter 3) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapter 2) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapter 3)

	• Propulsion Plant Manuals for DD-963, CG-47, and DDG-51 Class Ships; Volume 2 • NSTM, Chapter 234
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the preparation of engines for operation, starting procedures, cautions and parameters to be observed during the start/stop procedures, and casualty control actions required during the procedures.

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Replace gas turbine generators and power take off (PTO) shafts**
Knowledge you should have to perform this skill:	• Identify maintenance requirements for removal and replacement of gas turbine generators and PTO shafts • Identify safety precautions to be observed during generator and PTO shaft removal and installation • Identify documentation to be completed in the Marine Gas Turbine Logbook for generator and PTO shaft removal and installation
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapter 8) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapter 6)

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about gas turbine generator and PTO shaft removal and installation procedures, precautions, and documentation.

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Test, troubleshoot, and replace power turbine components**
Knowledge you should have to perform this skill:	• Identify power turbine components • Identify power turbine brake components • Identify component cleaning practices • Identify component testing procedures • Identify component replacement precautions • Identify component repair concepts • Identify abnormal conditions and corrective action required
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • NSTM, Chapter 234 • NSTM, Chapter 241
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the component identification, operation principles, repair procedures, and troubleshooting of power turbines and power turbine brake assemblies.

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Troubleshoot and replace combustion chamber components**
Knowledge you should have to perform this skill:	• Identify combustion chamber and fuel system components • Operation of combustion chamber and fuel system components • Test, repair, and replacement principles of combustion chamber and fuel system components • Identify abnormal conditions and the corrective action required
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapters 6 and 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapters 2, 5, 6, and 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapters 2, 5. 6, and 8)

	• Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapters 3-6, and 8) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapters 2-6)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation, inspection, troubleshooting, repair, replacement criteria and procedures of GT combustion chamber and fuel system components.

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Test, troubleshoot, replace, and borescope compressor section and components**
Knowledge you should have to perform this skill:	• Identify compressor section components • Identify borescope equipment and state uses • Identify abnormal conditions and the corrective action required • Identify compressor and compressor component replacement precautions
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS

	(S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapter 8) • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapter 6)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about compressor section borescope inspections and troubleshooting, identification of abnormal conditions within the compressor, and the corrective action required.

General GSM *Skill Area*	**Gas Turbine**
A *skill* you are expected to perform from the General Skill Area above:	**Adjust, test, and replace mechanical linkages**
Knowledge you should have to perform this skill:	• Identify types of mechanical linkages • Identify abnormal conditions and the corrective action required • Identify procedures for aligning mechanical linkages
References you should study to gain the knowledge you need to perform this skill:	• LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation; Chapter 8 (S9234-AD-MMO-010-090/LM2500) • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B) (S9234-ES-MMA-010) • NSTM, Chapter 234 • Description, Operation, and Installation Technical Manual for Model 104 GTGS (S9234-BC-MMO-010-050/MOD 104 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model 139 GTGS (S9234-B3-MMO-010-040/MOD 139 GTGS, Chapter 8) • Description, Operation, and Installation Technical Manual for Model AG9130 GTGS (S9311-AQ-MMO-010-060/MOD AG9130 GTGS, Chapter 8)

	• Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation (S9311-A3-MMA-010, Chapter 6)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the rigging, testing, and troubleshooting of mechanical linkages

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Troubleshoot bleed air system**
Knowledge you should have to perform this skill:	• Identify abnormal conditions in the bleed air system and the corrective action required • Bleed air system configurations for ship operations • System parameters • Identify bleed air system components • Recognize malfunctions in system components
References you should study to gain the knowledge you need to perform this skill:	• Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • NSTM, Chapter 551
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the ships bleed air systems with regard to alignments for Masker, Prairie, Anti-icing, and Starting, bleed air sources, system parameters, and component troubleshooting and identification, and, identification of abnormal conditions in the bleed air system and the corrective action required

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Troubleshoot waste heat boilers**
Knowledge you should have to perform this skill:	• Identify auxiliary boiler components • Identify waste heat boiler components • Identify waste heat recovery system components • Observe precautions and instructions when replacing components • Operation of auxiliary boilers • Operation of waste heat boilers • Operation of waste heat recovery system • Boiler cleaning and inspection requirements • Identify waste heat boiler operating parameters • Identify abnormal conditions and the corrective action required
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volumes 1 and 2 • NSTM, Chapter 221 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, and AOE-6 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation and maintenance of auxiliary and waste heat boilers and waste heat recovery systems, the requirements for cleaning and inspection of boilers, component identification, and waste heat/auxiliary boiler system casualties and the corrective actions required.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Replace air compressor components**
Knowledge you should have to perform this skill:	• Operation precautions and procedures • Monitor parameters • Identify compressor components • Identify malfunctioning components • Identify abnormal conditions and the corrective action required • Compressor repair principles
References you should study to gain the knowledge you need to perform this skill:	• EOSS procedures • NSTM, Chapter 551 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about air compressor component identification and replacement, compressor operation, trouble detection/isolation, and repair.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Replace rigid tubing**
Knowledge you should have to perform this skill:	• Identify discrepancies in piping and flexible hoses • Repair of piping and flexible hoses • Identify discrepancies in piping system components such as supports and sound isolation mounts • Inspect flange shielding and repair as necessary • Classify rigid tubing • Identify replacement procedures and precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 505
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about piping system component inspection and repair to include pipes, flange shielding, flexible hoses, RISIC couplings, and supports/hangers, piping identification and classification, and rigid tubing classification and replacement.

General GSM *Skill Area*	**Auxiliary Equipment**
A *skill* you are expected to perform from the General Skill Area above:	**Locate, isolate, and perform casualty control actions on water chemistry casualties**
Knowledge you should have to perform this skill:	• Identify water chemistry terms • Identify water chemistry characteristics • Identify water chemistry testing procedures • Identify water chemistry requirements • Identify water chemistry casualty control procedures • Identify water chemistry documentation
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volumes 1 and 2 • Propulsion Plant Manuals for DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about boiler water chemistry requirements, terminology, testing, treatment, casualty control, and documentation.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Repair and replace shafting components**
Knowledge you should have to perform this skill:	• Identify shafting components to included stern tube seals, bulkhead seals, stern tube seals, and line shaft bearings • Identify stern tube, bulkhead, and shaft seal components • Classify line shaft bearings Identify abnormal conditions and corrective action required • Identify line shaft bearing abnormal conditions and the corrective action required • Identify maintenance requirements for shafting components • Identify procedures and precautions to be observed while replacing/repairing shafting components
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 243 • NSTM, Chapter 244 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about main propulsion shafting component (stern tube seals, shaft seals, bulkhead seals, line shaft bearings, shaft construction) identification, propulsion shafting characteristics, maintenance, and repair/replacement procedures and precautions, and trouble isolation.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Troubleshoot, repair, and replace MRG and Clutch/Brake components and assemblies**
Knowledge you should have to perform this skill:	• Identify MRG and Clutch/Brake assembly components • Identify component repair/replacement procedures and precautions • Identify abnormal conditions and corrective action required
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 241 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the Main Reduction Gear and Clutch/Brake assemblies with regard to recognizing abnormal conditions, corrective action, component identification, and repair and replacement procedures and precautions to be observed.

General GSM *Skill Area*	**Main Propulsion**
A *skill* you are expected to perform from the General Skill Area above:	**Troubleshoot fuel oil systems**
Knowledge you should have to perform this skill:	• Identify fuel oil service system components • Identify fuel oil service system operating parameters • Identify abnormal conditions in fuel systems and the corrective actions required
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 541 • NSTM, Chapter 542 • Propulsion Plant Manuals for FFG-7, DD-963, CG-47, DDG-51, and AOE-6 Class Ships; Volume 1 • Operation and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Craft Information Book, Section II, Part 1, Chapter 7 (NAVSEA S9LCA-AA-SIB-010)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about fuel oil system operation, testing, maintenance, component identification, and troubleshooting and corrective actions

General GSM *Skill Area*	**Environmental Protection**
A *skill* you are expected to perform from the General Skill Area above:	**Establish hazardous waste disposal methods**
Knowledge you should have to perform this skill:	• Identify hazardous waste management instructions and control methods • Identify hazardous materials • Recognize hazardous material identification markings • State the storage requirements and limitations of hazardous material • Identify material safety data sheets • Identify oil spill kit components and usage procedures
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 593 • OPNAVINST 5100.19, Section B3, Hazardous Material Control and Management Program
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the hazardous material program with respect to material storage, disposal, spill clean up, and use and handling precautions as directed by MSDS sheets and the management of the Hazardous Material program.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Estimate fuel, lube oil, and water requirements**
Knowledge you should have to perform this skill:	• Identify Fuel Oil Quality Management Program requirements • Identify Lube Oil Quality Management Program requirements • Identify Boiler water/Feedwater Test and Treatment Program requirements
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 541 • NSTM, Chapter 542 • NSTM, Chapter 262 • NSTM, Chapter 220, Volume 2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the testing, treatment, and inventory control of fuel oil, lube oil, and boiler water/feedwater.

Part 3

Advancement Handbook for GSM1

Advancement Handbook for GSM1

General GSM S*kill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Update marine gas turbine service records (MGTSR)**
Knowledge you should have to perform this skill:	• Identify MGTSR sections and maintenance requirements • Identify procedures for updating, opening, and closing MGTSR • Identify different gas turbine technical directives and the required action in the MGTSR
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 234 • Marine Gas Turbine Technical Directives Manual, NAVSEA (T9234-AB-PRO-010) • General Gas Turbine Bulletin (GGTB Nr 3)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about MGTSR maintenance and updating procedures, upkeep requirements, and technical directive instructions.

Advancement Handbook for GSM1

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**File engineering logs**
Knowledge you should have to perform this skill:	• Identify engineering log and record storage requirements
References you should study to gain the knowledge you need to perform this skill:	• Engineering Department Organization and Regulations Manual, Chapter 5 • NSTM, Chapter 220, Volume 2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the time requirements for maintaining engineering logs and records.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Review ship-to-shore maintenance progress reports; review engineering and equipment degradations**
Knowledge you should have to perform this skill:	• Identify documentation required to support ship-to-shore maintenance • Recall administrative procedures of the 3-M system • Identify significant areas of Consolidated Ship's Maintenance Plan (CSMP)
References you should study to gain the knowledge you need to perform this skill:	• OPNAVINST 4790.4, Chapters 6 and 7
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the 3-M system administrative procedures, documentation requirements, ship-to-shore maintenance actions, and CSMP upkeep.

Part 4

Advancement Handbook for GSMC

General GSM *Skill Area*	**Environmental Protection**
A *skill* you are expected to perform from the General Skill Area above:	**Monitor Hearing Conservation and Heat Stress Programs**
Knowledge you should have to perform this skill:	• Identify hearing conservation program requirements and hazards • Identify heat stress program requirements and hazards • Maintain records of the heat stress program • Review heat stress program for discrepancies and perform corrective actions
References you should study to gain the knowledge you need to perform this skill:	• Engineering Department Organization and Regulations Manual, Chapter 5 • OPNAVINST 5100.19, Section B2 • OPNAVINST 5100.19, Section B4
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the requirements of the heat stress and hearing conservation programs, the maintenance of the required records, and the correction of hazards related to the programs.

General GSM S*kill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Review and maintain marine gas turbine service records (MGTSR)** [Occupational standard number(s): F607, F608 Related occupational standards:
Knowledge you should have to perform this skill:	• Identify MGTSR sections and maintenance requirements • Identify procedures for updating, opening, and closing MGTSR • Identify different gas turbine technical directives and the required action in the MGTSR
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 234 • Marine Gas Turbine Technical Directives Manual, NAVSEA (T9234-AB-PRO-010) • General Gas Turbine Bulletin (GGTB Nr 3)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about MGTSR maintenance and updating procedures, upkeep requirements and technical directive instructions.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Review automated alarm data logs, update Engineer's Bell log**
Knowledge you should have to perform this skill:	• Identify log keeping instructions and regulations • Identify log discrepancies and corrective actions required • Identify engineering log and record storage requirements • Identify Engineer's Bell log maintenance requirements
References you should study to gain the knowledge you need to perform this skill:	• Engineering Department Organization and Regulations Manual, Chapter 5 • NSTM, Chapter 090 • NSTM, Chapter 220, Volume 2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the storage time requirements and maintenance of engineering logs and records.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Update Engineering Operational Sequencing System (EOSS) Publications**
Knowledge you should have to perform this skill:	• Identify discrepancies requiring feedback reports and the type of reports required • Identify criteria for EOSS validations • Familiarization with the Users Guide (EUG)
References you should study to gain the knowledge you need to perform this skill:	• EOSS Users Guide (EUG)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the EOSS maintenance, documentation, and updating procedures.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Prepare full power and economy trial reports**
Knowledge you should have to perform this skill:	• Identify requirements for preparing and submitting full power and economy trial reports
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the preparation and submission of full power and economy trial reports.

General GSM *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Inventory and validate engineering bulletins and changes**
Knowledge you should have to perform this skill:	• Identify types of engineering bulletins and changes
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the storage and implementation of engineering bulletins and changes.

Appendix 1

References Used in This Advancement Handbook

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
GSM3	S9234-AD-MMO-010-090/LM2500	LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation	Chapters 3, 6, 8	1
	S9234-AL-GTP-010-040 S9234-D8-GTP-010-040 S9234-BL-GTP-010-040 S9234-GA-GTP-010-040 S9234-DA-OMI-010-040	Propulsion Plant Manuals for DD-963, CG-47, FFG-7, DDG-51, AOE-6 Class Ships	Volumes 1, 2, 3, 4	1
	S9234-ES-MMA-010	Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B)		1
	S9234-BC-MMO-010-050/MOD 104 GTGS	Description, Operation, and Installation Technical Manual for Model 104 GTGS	Chapters 2, 3, 5, 6, 8	1
	S9234-B3-MMO-010-040/MOD 139 GTGS	Description, Operation, and Installation Technical Manual for Model 139 GTGS	Chapters 2, 3, 5, 6, 8	1
	S9311-AQ-MMO-010-060/MOD AG9130 GTGS	Description, Operation, and Installation Technical Manual for Model AG9130 GTGS	Chapters 2, 6, 8	1
	S9311-A3-MMA-010	Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit	Chapters 2-6	1

		(APU) System/Installation		
	OPNAVINST 5090.1	Environmental and Natural Resources Program Manual		2
	NAVEDTRA 12001	Fireman TRAMAN		4
	NAVEDTRA 12964	Fluid Power TRAMAN		4
	S9200-A6-MMA-010	Operation and Maintenance Manual for LCAC Propulsion System	Chapter 5	1
	S9240-AA-MMA-010	Description and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Transmission System		1
	S9LCA-AA-SIB-010	Operation and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Craft Information Book	Section II, Part 1, Chapter 7	1
	COMNAVSURFLANT/ PACINST 3540.22	Engineering Department Organization and Regulations Manual	Chapter 5	3
	OPNAVINST 5100.19	Shipboard Heat Stress Control and Personnel Protection	Section B2	2
	OPNAVINST 5100.19	Hazardous Material Control and Management Program	Section B3	2
	NSTM, Chapter 079	Damage Control-Practical Damage Control	Volume 2, Section 30	1
	NSTM, Chapter 220	Boiler water/ Feedwater-Water Chemistry	Volume 1	1
	NSTM, Chapter 220	Boiler water/ Feedwater-Test and Treatment	Volume 2	1
	NSTM, Chapter 221	Boilers		1
	NSTM, Chapter 234	Marine Gas Turbine Engines		1

	NSTM, Chapter 241	Propulsion Reduction Gears, Couplings, Clutches, and Associated Components		1
	NSTM, Chapter 243	Propulsion Shafting		1
	NSTM, Chapter 244	Propulsion Bearings and Seals		1
	NSTM, Chapter 254	Condensers, Heat Exchangers, and Air Ejectors		1
	NSTM, Chapter 262	Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems		1
	NSTM, Chapter 503	Pumps		1
	NSTM, Chapter 504	Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments		1
	NSTM, Chapter 505	Piping Systems		1
	NSTM, Chapter 541	Ship Fuel and Fuel Systems		1
	NSTM, Chapter 542	Gasoline and JP-5 Fuel Systems		1
	NSTM, Chapter 551	Compressed Air Plants and Systems		1
	NSTM, Chapter 556	Hydraulic Equipment (Power Transmission and Control)		1
	NSTM, Chapter 593	Pollution Control		1
	NSTM, Chapter 635	Thermal, Fire, and Acoustic Insulation		1
GSM2	S9234-AD-MMO-010-090/LM2500	LM2500 Propulsion Gas Turbine Engine Module Description, Operation, and Installation	Chapter 3	1
	S9234-AL-GTP-010-040 S9234-D8-GTP-010-040 S9234-BL-GTP-010-040	Propulsion Plant Manuals for DD-963, CG-47, FFG-7, DDG-	Volumes 1, 2, 3, 4	1

	S9234-GA-GTP-010-040 S9234-DA-OMI-010-040	51, AOE-6 Class Ships		
	S9234-ES-MMA-010	Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Main Propulsion Engine (Model TF40B)		1
	S9234-BC-MMO-010-050/MOD 104 GTGS	Description, Operation, and Installation Technical Manual for Model 104 GTGS	Chapters 2, 3, 5, 6, 8	1
	S9234-B3-MMO-010-040/MOD 139 GTGS	Description, Operation, and Installation Technical Manual for Model 139 GTGS	Chapters 2, 3, 5, 6, 8	1
	S9311-AQ-MMO-010-060/MOD AG9130 GTGS	Description, Operation, and Installation Technical Manual for Model AG9130 GTGS	Chapters 2-6	1
	S9311-A3-MMA-010	Operation and Maintenance Manual for Landing Craft Air Cushion (LCAC) Auxiliary Power Unit (APU) System/Installation	Chapters 2-6	1
	S9234-D1-GTP-010/LM2500	Internal Inspection and Evaluation of Marine Gas Turbine Engines		1
	S9200-A6-MMA-010	Operation and Maintenance Manual for LCAC Propulsion System	Chapter 5	1

	S9LCA-AA-SIB-010	Operation and Maintenance Manual for Landing Craft, Air Cushion (LCAC) Craft Information Book	Section II, Part 1, Chapter 7	1
	OPNAVINST 5100.19	Shipboard Heat Stress Control and Personnel Protection	Section B3	2
	NSTM, Chapter 220	Boiler water/ Feedwater-Water Chemistry	Volume 1	1
	NSTM, Chapter 220	Boiler water/ Feedwater-Test and Treatment	Volume 2	1
	NSTM, Chapter 221	Boilers		1
	NSTM, Chapter 234	Marine Gas Turbine Engines		1
	NSTM, Chapter 241	Propulsion Reduction Gears, Couplings, Clutches, and Associated Components		1
	NSTM, Chapter 243	Propulsion Shafting		1
	NSTM, Chapter 244	Propulsion Bearings and Seals		1
	NSTM, Chapter 262	Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems		1
	NSTM, Chapter 541	Ship Fuel and Fuel Systems		1
	NSTM, Chapter 542	Gasoline and JP-5 Fuel Systems		1
	NSTM, Chapter 551	Compressed Air Plants and Systems		1
	NSTM, Chapter 593	Pollution Control		1
GSM1	T9234-AB-PRO-010	Marine Gas Turbine Technical Directives Manual		1
	GGTB Nr. 3	General Gas Turbine Bulletin Nr. 3		5
	CINCLANTFLT/PACI	Engineering	Chapter 5	

	NST 3540.22	Department Organization and Regulations Manual		3
	OPNAVINST 4790.4	Ship's Maintenance, Material Management (3-M) Manual	Chapters 6, 7	2
	NSTM, Chapter 234	Marine Gas Turbines		1
	NSTM, Chapter 220	Boiler water/ Feedwater-Test and Treatment	Volume 2	1
GSMC	T9234-AB-PRO-010	Marine Gas Turbine Technical Directives Manual		1
	GGTB Nr. 3	General Gas Turbine Bulletin Nr. 3		5
	CINCLANTFLT/PACI NST 3540.22	Engineering Department Organization and Regulations Manual	Chapter 5	3
	EUG	EOSS Users Guide		
	NSTM, Chapter 090	Inspections, Tests, Records, and Reports		1
	NSTM, Chapter 220	Boiler water/ Feedwater-Test and Treatment	Volume 2	1
	NSTM, Chapter 234	Marine Gas Turbines		1

LEGEND:

Note 1 - To order, MILSTRIP to Naval Inventory Control Point (NAVICP) Philadelphia, PA or via INTERNET http://www.nll.navsup.navy.mil

Note 2 - Available via INTERNET http://www.nll.navsup.navy.mil or http://www.dodssp.daps.mil/usndirs.htm

Note 3 - Fleet Publications Library CD-Rom

Note 4 - Catalog of Nonresident Training Courses, NAVEDTRA 12061

Note 5 - Available via INTERNET http://www.navygasturbines.org